“A study of sustainable logistics development system in India with reference to Pune and NandedDistrict”

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1. Introduction

Sustainable and environment logistics are becoming more and more important in today's competitive marketplace. Due to its importance in supply chain management and its involvement in manufacturing industries improvement. Logistics makes it easier for customers to receive the goods and services they want and need. Academics and practitioners throughout the world are increasingly interested in green supply chain management (GSCM). Identifying definitions and supply chain management are necessary for a thorough examination of sustainable development (i.e. environmental, economic, and social considerations). A conceptual framework for a green supply chain network has been addressed in this paper, and the authors have identified other research avenues. Sustainable logistics' growing global recognition and an outline of its social implications are also discussed in the study. Various social aspects of logistics sustainability were discovered by a comprehensive review of the literature. In this study, the focus is solely on the social aspects of sustainability in the logistics manufacturing industry.

Keywords: sustainable logistics, Manufacturing Industries, Green supply chain management (GSCM).

Due to severe global competition, the manufacturing industry is currently confronted with a number of key problems, including a shift away from the conventional one-size-fits-all mass production model to one that emphasises mass customization. Researchers have focused on modular design, reconfigurable manufacturing systems, and e-logistics at various stages of a product's lifecycle. A holistic strategy that takes into account each stage of the product lifecycle in real time has been attempted far fewer times. New product development (NPD) is a tough environment for product designers, producers, environmentalists, and decision-makers because of the increasing environmental concern of consumers.

When it comes to logistics, moving products and services from "the point of origin" to "the point of consumption," as described by the Council for Supply Chain Management Professionals, is what it takes. The physical flow of a product is determined by the distance between the product's production and consumption. Material, work-in-progress, and final products are all examples of physical logistics flows in a manufacturing organisation (including Home Textile firms)

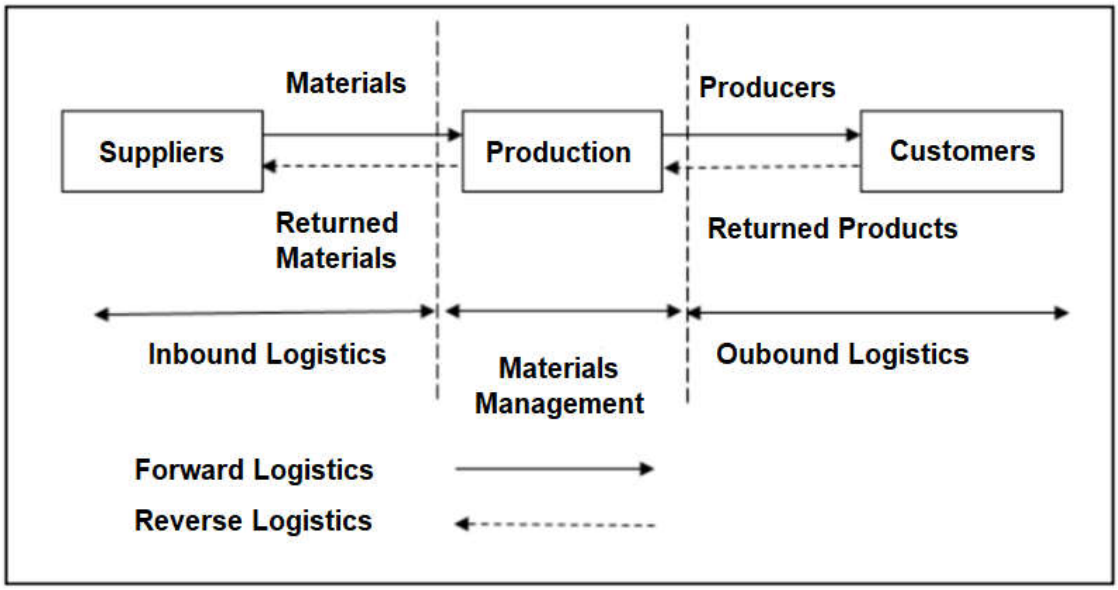

Fig 1: Process of Logistics in Manufacturing Industries

Efficacious Supply Chain Management (SCM) has grown rapidly in the last decade due to widespread demand and quick expansion. The global industrial market has entered a new phase of competitiveness amongst manufacturing industries that centred around Supply Chain Management (SCM) with rapid advancements in logistics systems, the internet, and production procedures. With this rapid development in environmental awareness and consciousness, there is a pressing need for environmental protection and conservation in the context of supply chain management. Oliver and Webber, two well-known manufacturing academics, created the term "supply chain management" in the early 1980s. Supply Chain Management has traditionally been defined as the process of changing raw resources into finished goods and then distributing these finished goods to their intended customers. Non-physical or intangible flows of data and information through supply chain management have also been emphasised by several distinguished academics, in addition to the strong corporate concern for tangible or real product movement. Intangible factors such as trust building, product development, market information exchange requirements, improvement in operational working, reduction of dependency on a particular supplier, and several strategic purchases are often included in the intangible importance category within the company and throughout the Supply chain. Because of this, the supply chain lifecycle becomes excessively complicated. Furthermore, Welford argues that in today's globalised world, the interdependence of multiple supply chains is crucial in light of the growing environmental responsibilities everywhere. Sustainability and other environmental issues are therefore

essential components of all supply chain activities and have a significant impact on SMEs in both developed and developing nations in the current context.

2. Green Logistics

It's critical to grasp the meaning of green logistics as defined by that term's original coiner. In general, green logistics refers to the long-term viability of this business endeavour. Green logistics is described as a set of sustainable policies and procedures aimed at reducing the environmental impact of running logistics activities from a company's point of view. Deconstructing the term "green logistics" into its component parts can help the author discover the relationship between "green" and "green logistics" as a whole, which will in turn help clarify the term's proper definition. As a result, the definitions of green logistics from the perspectives of several researchers are outlined below. The primary goal is to have a comprehensive understanding of the term "green," which stands for long-term sustainability and environmental stewardship. The Three Pillars of Sustainability can be used to green logistics, as illustrated in Figure 2. The old role of logistics distribution, which relied solely on economic concerns, has been drastically altered by the modern period.

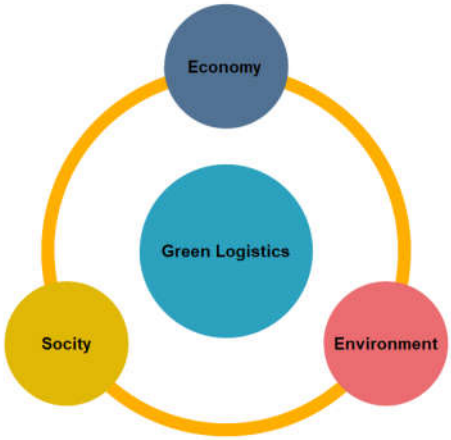

Fig 2:The Three Pillars of Sustainability can be used to green logistics

A. Scope of the Research

The supply chain is critical in dealing with demand and supply fluctuations that cannot be predicted, allowing for more operational flexibility and, ultimately, cost savings through economies of scale. Industries are lowering their ownership of raw materials and channel obligations as they place more emphasis on core capabilities and process flexibility. Outsourcing these tasks to non-human entities raises concerns about their ability to do the

work correctly. Managing supply efficiency and preventing overproduction are critical to enhancing supply chain and customer trust. The study's significance lies in its focus on the importance of e-enabled SCM/IT-enabled SCM in the garment industry and its impact on the entire business.

Researchers hope to build on their current work by tackling real-world challenges using e-enabled solutions and developing analytical tools to go along with them. Data integration and system processes are prerequisites to supply chain management's process implementation. The usage of supply chain process modelling in the analytical layer, which must interface with ERP, will lead to standard processes and supply chain collaboration. On the basis of this study, the influence of information transparency on the enterprise business process and operational costs will be studied. In addition, this study intends to examine the impact of ERP on supply chain decision making and ERP's role in adopting standard supply chain processes and SCM collaboration in the context of this research. Research gaps were discovered by the research by several research reconnaissance measures, an exhaustive literature evaluation, and discussions with experts in the industry.. In addition, the researcher studied a wide range of literature on the trends and topics highlighted in the introduction. Questions were prepared based on the results.

B.Problem Statement

An important part of this process is ensuring that items are manufactured in a way that is flexible enough to cater to specific markets. It refers to both the product flow through the manufacturing facilities and the degree of flexibility provided by those facilities. The Internet helps organisations in a manufacturing supply chain gain visibility into the data they need, and it also improves the movement of goods through manufacturing facilities. Companies are able to predict and respond to changes in demand. Using the internet, the primary goal is to cut inventory and lead times, allowing businesses to be more responsive to changes in demand. Because of the increased speed of communication, production cycle times can be cut in half. All aspects of the supply chain are affected by the Internet's impact on industrial flow management. An organization's internal management of this process, such as installing a production planning system to examine production requirements and the company's many manufacturing facilities, might be influenced by the Internet.

C.Objective

The main objectives of the work is

- With regard to the Pune region, to identify and evaluate all of the common green supply chain efforts that are being implemented by Indian manufacturing businesses, and to conduct a cross-country comparative assessment between India and its competitors
- In order to improve the export prospects of manufacturing companies, it is necessary to suggest proper methodologies for implementing green supply chain management.
- For Indian manufacturing firms in Pune, the development and validation of a relationship model for green supply chain management pressures, practises, and performance is underway.
- Based on the environmental performance of selected Pune area manufacturing companies supply chains, this study assesses, quantifies, compares, and benchmarks.

D Hypothesis

H1: When it comes to Green supply chain management and its various domains, the size of the organisation (small, medium, or large) makes no difference at all.

H2: Green supply chain management and its domains' scores are unaffected by the type of ownership (proprietorship, partnership, or private limited business).

H3: In terms of Green supply chain management and its domain scores, the number of operational plants (one, two, three, and more) makes no major effect.

H4: According to Green supply chain management and related domains, the number of personnel working (150) has no major impact on the scores.

3. Literature Survey

Due to the accelerating pace of activities, operations, and new technology, supply chains are becoming increasingly complicated as new sustainability paradigms are introduced into highly fragile and sensitive contexts. The state of sustainable supply chain networks models has thus far received little attention because only a few studies have focused on sustainable development as a primary aspect of the problem at hand. Sustainability in the supply chain network has been the subject of multiple studies by academics from 2010 to 2021, and the results of these studies have been summarised in this review by Sidharath Joshi et al., (2022). A new set of dimensions for designing a sustainable supply chain network, complete with indications and parameters, has been developed. In addition, researchers and practitioners are

given future paths and research orientations to examine sustainability concepts and new research outlets to more effectively address sustainability concerns.

NSF sponsored workshop recommendations are examined in this paper by S. DAVID WU and co-authors (2021). The authors have attempted to extract, synthesise and refresh the vision that was developed during this meeting through their own research efforts. The taxonomy we propose to convey this vision categorises manufacturing logistics research problems by the physical entities (systems) involved, the level of abstraction, the focus and type of decision (decision scope) intended, as well as the broader business context (business environment) for which the research can be justified. By taking into account business settings and technical changes explicitly, the article hopes to imagine a bigger and richer research basis for manufacturing logistics. It is our belief that these new directions in manufacturing logistics research provide OR/MS specialists with an opportunity to have an impact on business strategy and software development.

The results of a survey on logistics and its evolution in Bulgarian manufacturing and trading enterprises are presented in the article by Rakovska et al. In order to create a conceptual framework for the survey that reflects the current evolution of logistics, some theoretical and methodological issues in logistics and supply chain management are clarified. The framework examines the extent to which companies' knowledge and awareness of logistics' role in management as well as the practical implementation of logistics methods and management tools within and across enterprises in the supply chain are both included in the framework.. Methodologies from earlier studies in Bulgaria on internal logistics integration and supply chain management were combined and adjusted. To stay competitive in today's market, businesses must employ a variety of technological and operational approaches. Fu Q et al., (2022) are now investigating the link between sustainable supply chain management (SSCM) and corporate success, with an emphasis on operational and financial performance. Research into operational structure, resource usage and strategic tool identification helps to improve the organization's performance. Unstructured interviews with 41 industrialists were performed by the researchers, who then examined the data using open-source coding and deduction. By studying critical scientific literature and conducting unstructured interviews, a questionnaire was constructed Respondents from 202 industrial corporations were surveyed for this study. Structural evaluations show that SSCM implementation increases operational and financial performance significantly. Analysis of multivariate statistical data as well as structural equation modelling (SEM) is used to illustrate how SSCM is related to previous

literature review findings in terms of supply chain strategy, supply chain network design, organisational structure and information system (SEM). Current study shows that SSC plays an important role in speeding up the operational and financial performance of organisations, suggesting that SSCM should be treated as a secondary strategy and integrated with the entire company strategy.

Understanding the links between the manufacturing and logistics industries is essential to exploring and increasing the efficiency of their joint development. theoretical and empirical testing of the coupling coordination model is done in order to determine the degree at which high-quality development of logistics and manufacturing industries can be coupled and coordinated.. Although these concerns have been discussed in the literature, they remain largely unsolved in the real-world application of sustainable supply chain management and performance evaluation. The research community is still debating topics like how to manage supply chains in developing economies and how to make use of Industry 4.0 technologies.

The competitive landscape is shifting, manufacturing costs are rising, fuel prices are on the increase, and globalisation poses new political and economic difficulties. Organizational performance improvement and achieving a competitive edge over rivals are heavily dependent on supply chain management, as supply chains are now competing against one other. For long-term firm sustainability, companies believe that a green supply chain is essential for transportation and logistics, according to the report. Another important problem for companies exporting to the emerging markets is export compliance. More or less, transportation and warehousing systems have stabilised, and corporations are trying to maximise their efficiency. Despite the fact that vehicle firms and their suppliers are connected, the lack of real-time information makes it impossible for them to communicate. For businesses, visibility into their supply chain has emerged as the most pressing issue.

As India's economy and urban population continue to grow at a rapid pace, global rivalry is heating up. Recently, according to a report by the International Monetary Fund (IMF), India is expected to overtake the United Kingdom in the rankings of the world's top economies in 2019. This is because of India's large population, favourable demographics, and the implementation of GST, which has fueled the Indian economy's recent expansion. It's vital to note that, according to the World Bank's most recent Doing Business Report(DBR, 2019), India has risen from 100th place in 2017 to 77th place among 190 nations evaluated by the World Bank. Consequently, all sectors in India must have recently undergone significant

change. Described in this research by Karthikeyan et al., (2019), the most current changes to logistics and supply chain management in India are presented. Previously, India was ranked 54th in the World Bank's Logistics Performance Index (LPI), but that has since risen to 35th place.

Research is focused on the adoption of sustainable supply chain management (SSCM) in Indian manufacturing enterprises. There will be a comparison between the findings of many surveys done on large Indian firms and those made by other surveys in developed and developing nations in this study by Ghosh, Arijit. (2019). This article will also throw light on the efforts that organisations must take to raise awareness about the sustainability of SSCM practises and, as a result, draw conclusions about a future roadmap for SSCM.

4. Research gap based on Literature survey

Because the subject of Green Supply Chain Management (GSCM) was only formed after 1989, the researcher has endeavoured to look at GSCM from a variety of viewpoints in and of himself. This is due to the fact that the primary focus of GSCM operations and projects is on reducing waste in manufacturing, taking environmental issues into account throughout production, and generally going green with SCM activities. According to the review, the following issues have been found

- It has been noticed that most of the GSCM studies have been undertaken in Indian manufacturing industries, regardless of the subcategories. Only a handful of research has been published in the Indian setting and the Indian manufacturing industry.
- They all focus more on vehicle, pulp and paper, infrastructure, electrical and electronic, retail, logistics (3PL) and other industries. There is a paucity of information available on the processing industries. Because of this, there is still room to learn about how Indian export-oriented manufacturing companies use GSCM.
- There is a need for further study in this area, and this work is aimed at filling it.

5. Research Methodology

Logistics effectiveness serves as a construct of logistic performance in India, and this study employs a Descriptive Explanatory research style to examine its relationship with other factors of competitive competence and organisational performance. Quantitative analysis was

used to verify the hypotheses. A survey-based tool is used to conduct the investigation. The following diagram depicts the major steps in this study's research design.

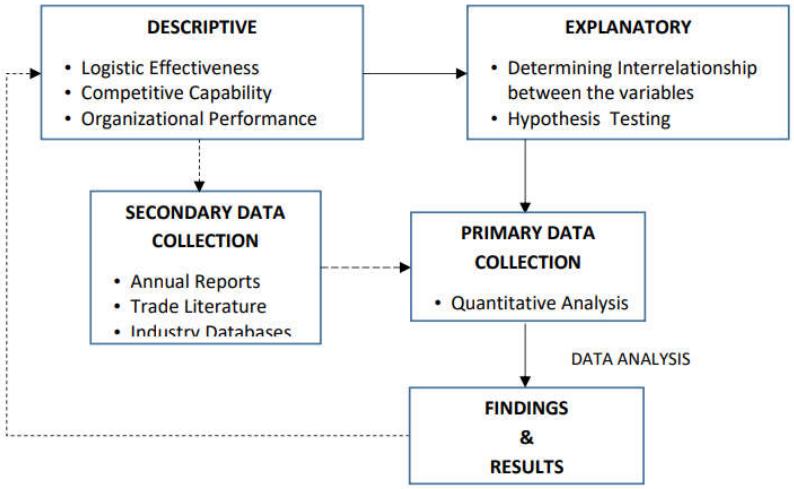

Fig 3: Structure of Research design

a. Data Collection

In order to answer specific research questions, academic scholars typically need to collect two types of data: primary and secondary. The term "primary data" refers to information that has been acquired from its original sources and is deemed to be directly relevant to the study's subject. Secondary data, on the other hand, is data that has already been acquired by other researchers. However, each set of data has its own unique set of capabilities that the author might use in the course of his or her study. Even while main data can provide exact insights into the research's requirements, secondary data is equally critical to get a variety of viewpoints on the subject matter and provide a solid foundation for understanding primary data, as well.

b. Primary Data Collection

The primary method of gathering data is an interview. When accurate material in spoken verbal form is obtained to address research questions, interviews are considered one of the most extensively used qualitative research techniques. Due to their distinct functionality and structure, researchers can choose between three different types of interviews: structured interviews, semi-structured interviews, and in-depth interviews. Semi-structured interviews were the primary data

gathering strategy used by the author due to the nature of the research. Semi-structured interviewing necessitates that the interviewer have a crystal-clear understanding of the research issue and its findings before beginning. As a pre-requisite for conducting interviews fairly and collecting the relevant data, a "interview guide" with pre-prepared interview questions must be created. Questions can be reordered throughout the interview, as well as the subject matter, to get more in-depth responses from respondents. A common feature of semi-structured interviews is the use of open-ended questions in which participants are invited to share their own thoughts and feelings about the subject matter.

c. **Secondary Data Collection**

For an analysis of a case company's ability to deal with green outbound logistics concerns during the e-commerce process, the author must also evaluate secondary data from both text and non-text sources. Secondary data, as previously said, serves as a supplement to primary data by providing quick access and cost savings while still meeting relevancy standards. But the author is conscious that secondary data can suffer from a lack of validity and dependability in their conduct context, which can alter the overall conclusions of this study. In addition to conducting desk research on topic-relevant publications, books and newspapers, has obtained reports on sustainability as part of the research process for this work.

d. **Sample Selection**: In Pune District on the basis of primary and secondary data we found following companies' details in small, medium and large sectors as well as 3PL, 4PL companies are included in that. In primary details on telephonic interviews, questionnaire we found sample size from Pune Nanded.

Sr.No	Company	Total	Selected Sample companies Pune	Selected Sample companies Nanded	Percentage
1	Small	120	40	25	50%
2	Medium	130	50	20	50%
3	Large	125	25	15	50%
	Total	375	115	55	50%

Source: Pune and Nanded logistics dictionaries 2020

e. Data analysis

Semi-structured interviews were used to obtain the data, and the author then decided to use the theme analysis to sort it. It is necessary to conduct a series of interviews and field observations in order to gather qualitative data, and then conduct a thematic analysis in order to look for patterns and themes that may be found across the dataset. For qualitative data, this method is thought to be the most logical and methodical way to examine the data, allowing for the discovery of complex structures and relationships that may be further explained or linked through the data. It is, nevertheless, necessary for researchers to have a strong theoretical background in order to begin the analysis with logical theoretical-derived themes, which can aid in the development of research questions.

6. Conceptual Framework

It is imperative for the future of manufacturing to develop new products that are environmentally friendly and sustainable. Figure 4 depicts the conceptual framework for long-term new product development. In order to survive in today's global competitive economy, one must either collaborate with other businesses (especially small and medium-sized ones) or compete with those sectors. As a result, various forms of cooperation or competition should be incorporated into new product development in order to meet client expectations.

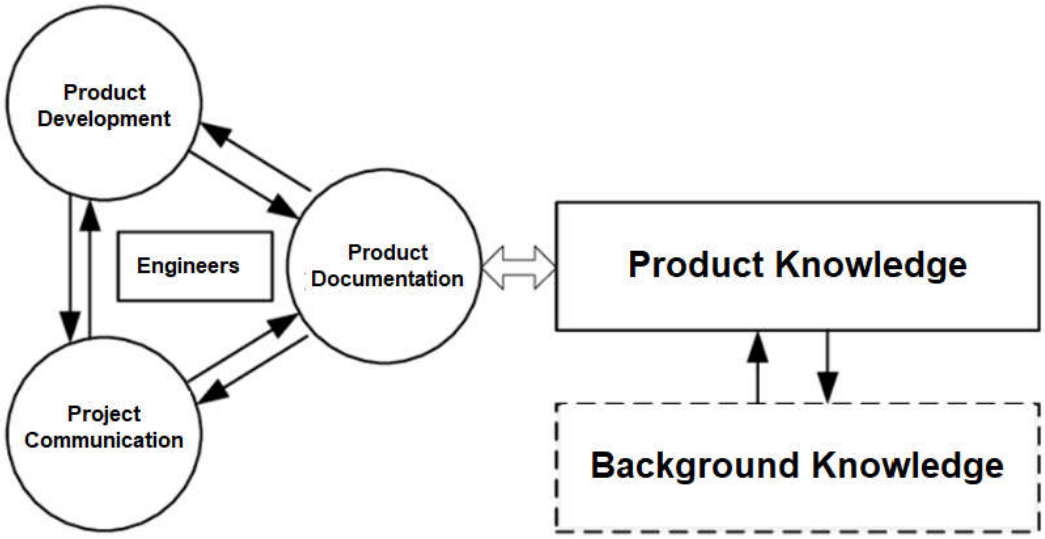

Fig 4: Conceptual Framework for new Product Development

7. Limitations and findings of the Study

- A survey of 110 leather makers and exporters in the Pune region of India was done to better understand the current state of Green Supply Chain Management in the country's export-oriented industry.
- Because the majority of respondents were small, medium, and large-scale firms, it is possible that their low green scores and difficulty in implementing GSCM may be attributed to the fact that most respondents had low green scores.
- Small- and large-scale manufacturers and exporters may have very diverse views on the issue.

Chapter Plan:

1.Introduction.

2. Research Methodology and Review of literature

3. Profile of Logistics industries in Pune and Nanded district

4. Data Analysis and Interpretation of data

5. Findings, Conclusion and Suggestions.

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